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Installation and user guide for

ExoAir™

and

ExoAir™ Polaris

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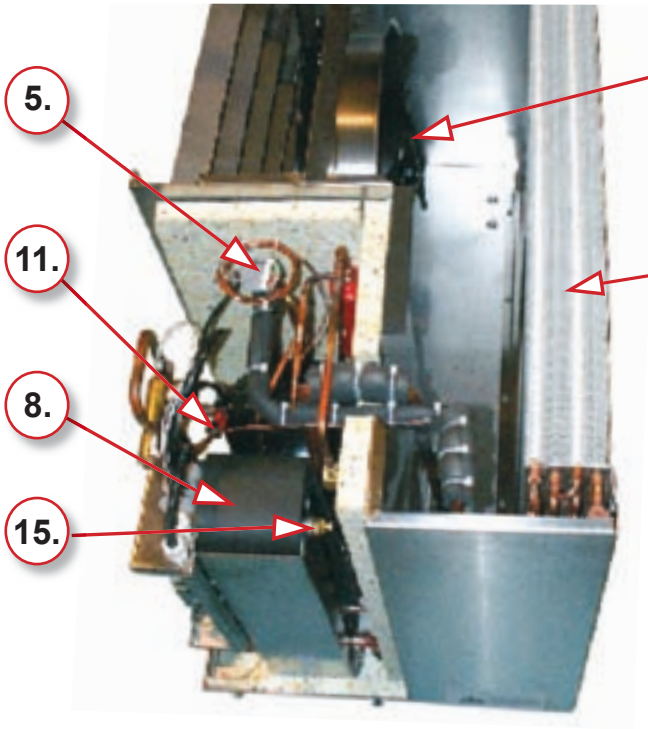
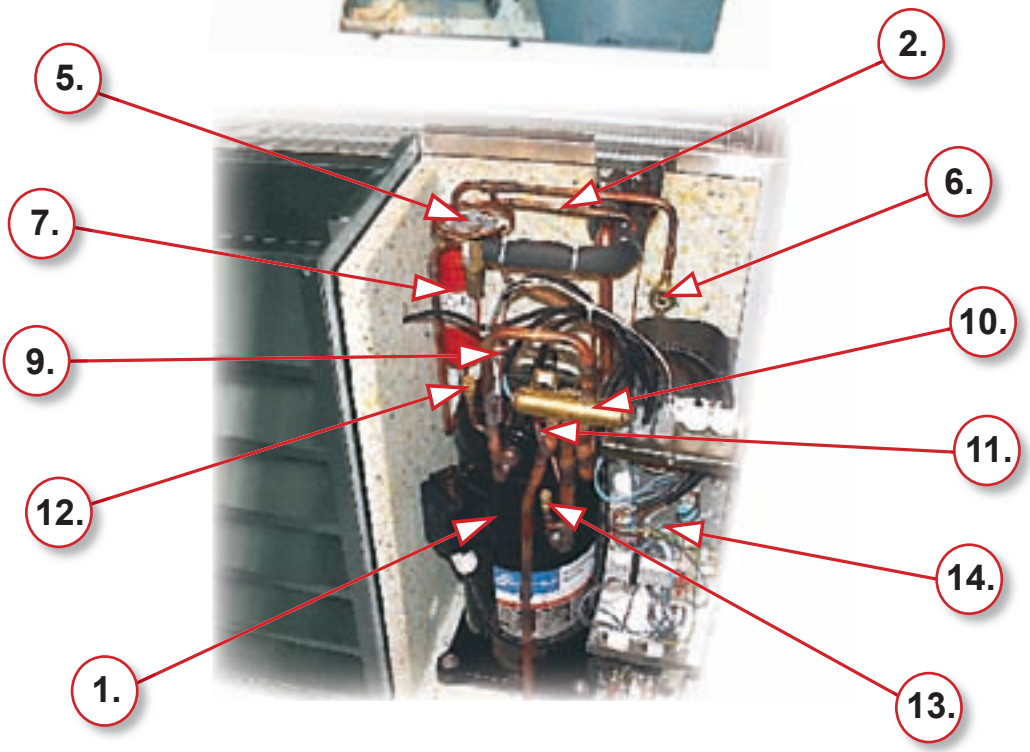
1 Component location in ExoAir

Fig. 1



Top view

Fig. 2

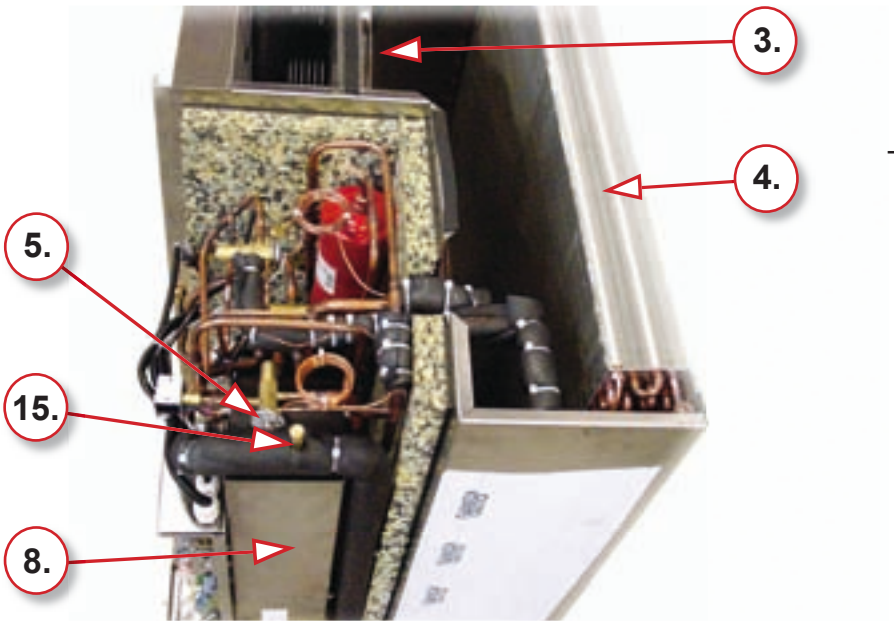


Front view

1. Compressor
2. Check valve
3. Fan
4. Evaporator
5. Expansion valve
6. Sight glass
7. Drier filter
8. Condenser
9. High pressure pressostat
10. 4 way valve
11. Low pressure pressostat
12. Service connector/Schrader High pressure
13. Service connector/Schrader Low pressure
14. Electrical distribution box
15. Vent valve water circuit

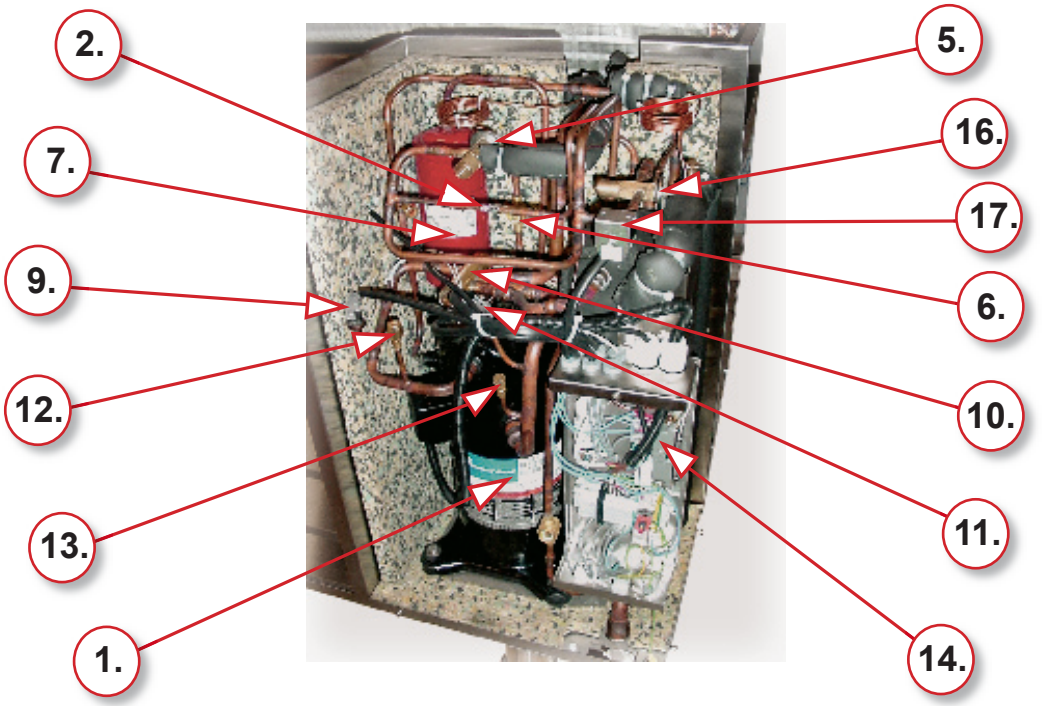
2 Component location in ExoAir Polaris

Fig. 3



Top view

Fig. 4



Front view

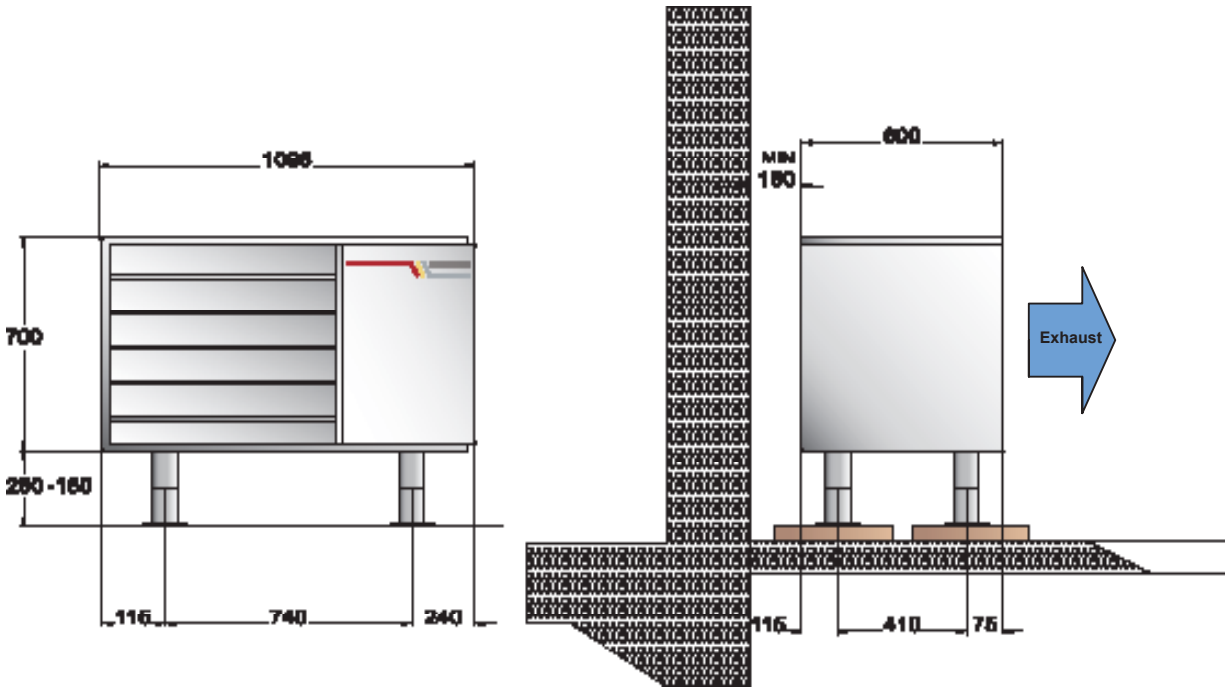
1. Compressor
2. Check valve
3. Fan
4. Evaporator
5. Expansion valve for main circuit
6. Sight glass
7. Drier filter/refrigerant reservoir
8. Condenser
9. High pressure pressostat
10. 4 way valve
11. Low pressure pressostat
12. Service connector/Schrader High pressure
13. Service connector/Schrader Low pressure
14. Electrical distribution box
15. Vent valve water circuit
16. Expansion valve for EVI circuit
17. Solenoid

3 Positioning and setting up

ExoAir must be located outdoors. It is positioned with consideration to the proximity to ExoTankAir. Even though ExoAir has very low noise levels it should be positioned so that it causes minimum disturbance for neighbours (min 4.5 m from the boundary of the plot) and other residents of the building.
At hot times of the year the fan runs at reduced speed to further reduce the noise level. Proximity to Exo-TankAir means that the installation is simpler and easier and there are less heat losses.

ExoAir has four legs and is best located on four garden paving slabs on a gravel or shingle bed that can absorb condensation and meltwater from the heat pump. See Fig 5. The normal set up is against an outer wall a minimum of 150 mm from the wall. If the heat pump is placed in a corner, the distance from the end to the wall must be at least 250 mm. In general, the air supply and exhaust air flow as freely as possible and obstructions must not direct the exhaust air to the air inlet at the rear.
It should not be positioned in an outhouse or carport. The heat pump must not be placed on a roof as this makes servicing difficult, and can cause larger wind loads than the unit is dimensioned for.
The heat pump is designed to stand outdoors without a protective roof or similar. Because meltwater and condensation drip from the rear edge under the evaporator, make sure that the water does not run off to areas that may freeze in winter. The heat pump is positioned horizontally.
The legs are height adjustable by twisting the lower part of the leg. Normally, the legs do not need to be secured to the paving slabs or the foundation. Position the heat pump so that it is easily accessible for service and maintenance. See Fig 5.

Fig. 5

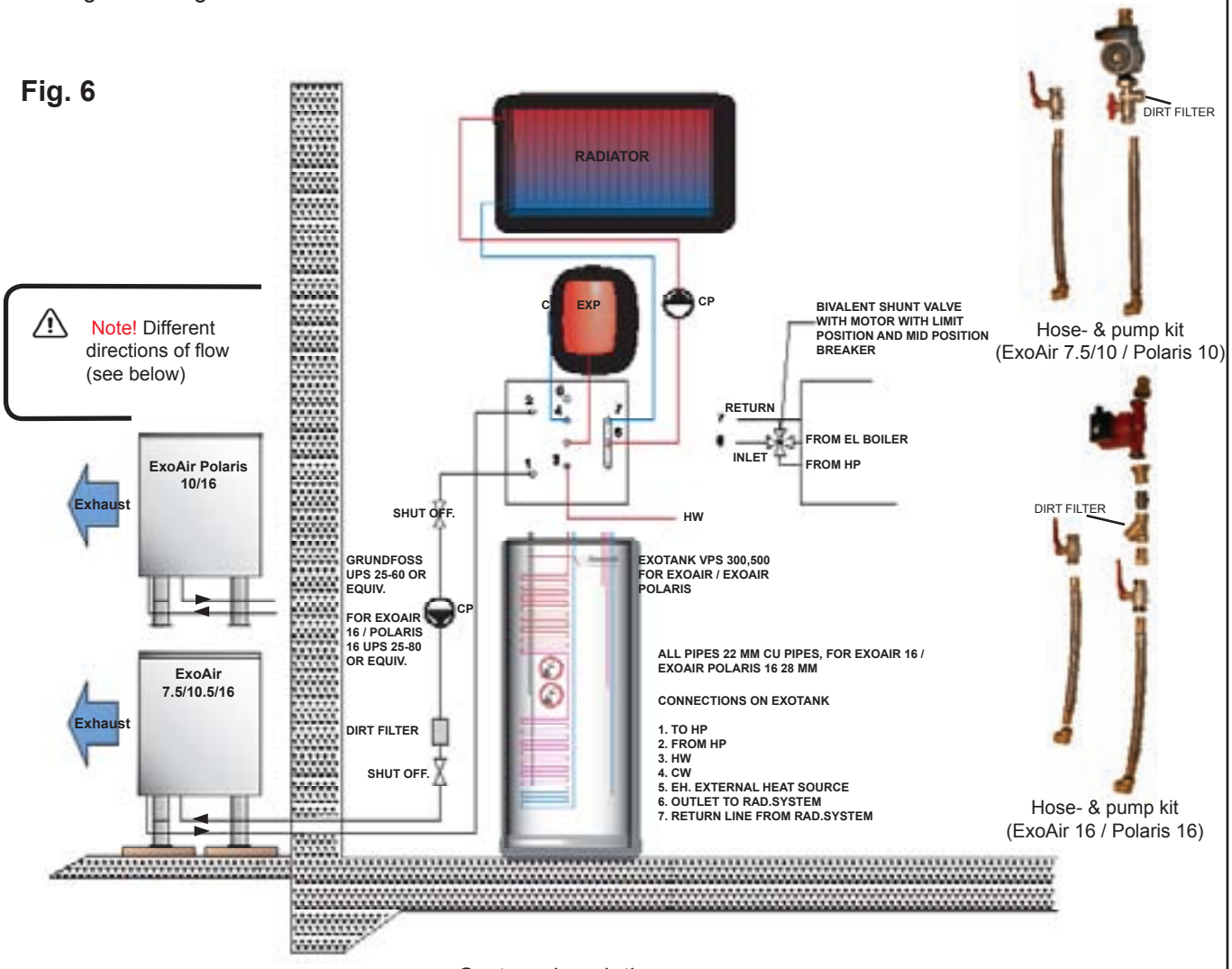


Set up instructions and dimensions

4 Pipe work and circulation pump

The inlet and return pipes between ExoAir 7.5 /10.5 and Polaris 10 and accumulator tank ExoTankAir areØ 22 mm pipes. For ExoAir 16 / Polaris 16 Ø 28 mm pipes are used. See Fig 6.
The connection between ExoAir and pipe is made usingØ 22 mm (For ExoAir 16 / Polaris 16, Ø 28 mm) metal braided hose, to prevent noise being transferred to the pipe work in the house.
Outdoors the pipes and hoses must be insulated using at least 15 mm thick armaflex or equivalent insulation, that is insulation that is moisture resistant and is not affected by moisture from outside.
Insulation at least 8 mm thick must be used indoors. Pipe work must be laid out so that it is self venting if possible. In ExoAir the venting is at the highest point at the back of the condenser. If the pipe work must be laid out with another highest point a vent is recommended.
The circulation pump must have a 6 m feed height at 0 flow.
We suggest Grundfoss UPS 25-60 or equivalent for ExoAir 7.5 and ExoAir 10.5 / Polaris 10.
UPS 25-80 is recommended for ExoAir 16 / Polaris 16.
The circulation pump and dirt filter are installed indoors on the return pipe for the heat pump so that it is self venting according to the manufacturer's instructions.

Fig. 6



System description

Note! The flow diagram above refers to the radiator system. Likewise floor heating, required after shunt according to the manufacturers instructions. The position shown is to simplify the illustration.

Hot water

ExoTank VPS is equipped with double coil exchangers that heat the hot water continuously at the outlet. For large hot water requirements such as for a hot tub, the coil exchanger may need to be supplemented with an electric hot water heater. The heater is then connected in series with the coil exchanger in ExoTank VPS.

Hot water circulation, hwc, is not suitable for combination with ExoTank VPS.

The water softener ExoRen is recommended for use in hard water areas. This prevents problems with calcium deposits in the pipes and hot water heater. Sold as an accessory.

Power cuts

In event of long power cuts and low outdoor temperatures, the water in the condenser can freeze. To prevent this, the water can be drained by slackening off the pipe connections under the heat pump with a suitable wrench. Before the connections are slackened off, the ball valves for the inlet and return lines must be closed (Hose & pump kit fig 6.)

When the heat pump can be put into use again, reinstall the pipes and open the ball valves. Before starting operation, the air in the system must be vented using the venting valve on the condenser (pos 15. fig 1 ExoAir/ fig 3 Polaris).

5 Electrical installation

Electrical installation must be carried out by an authorised electrician. All cable routing must be according to the applicable regulations. ExoAir and ExoTank Air are connected according to the wiring diagram on pages 12-13.
The electrical connection to ExoTrol is made using wiring to ExoAir and ExoTank as well as outdoor sensor and room sensor. Fig 7.

Fig 7.

Exotrol with wiring supplied

Indoor sensor

Outdoor sensor

ExoTrol is installed close to ExoTank Air, at eye level. The two pre-installed cables with multi-pole pin connectors that must be connected to ExoTank Air are each 3 m long.
Supply from the house's fuse box is via (5G x 4mm2 20A 400V) to the safety breaker switch which breaks all the phases and neutral. The cover of the electrical cabinet can only be opened when the main switch is switched off. Fig 8.

Fig 8.

Exotrol with front panel removed

Exotrol with front panel removed and control panel folded down

The table records the current consumption that can occur with different combinations of heat pumps and heating cartridges. It can be generally said that the heat pump current consumption (and output) increases with rising air temperatures and therefore higher evaporation temperature. The table shows the current consumption at an evaporation temperature of -10ºC and condensing temperature 60ºC.

Model	H pump Incl charge pump and fan	Hp+3kw (4.3)	Hp+6kw (8.7)	Hp+9kw (13A)	Hp+12kw (17.3A)
ExoAir 7.5	5.5A	9.8A	14.2A	18.5A	22.8A
ExoAir 10.5	7.3A	11.6A	16A	20.3A	24.6A
ExoAir 16	11.0A	15.3A	19.7A	24A	28.3A
Polaris 10	6.0A	10.3A	14.7A	19.0A	23.3A
Polaris 16	8.9A	13.2A	17.6A	21.9A	26.2A

Note! ExoTrol is dimensioned for max 25A. If the heat pump, in combination with the heating cartridges, has a current consumption greater than 25A, a cartridge must be controlled separately and not through ExoTrol, alternatively choose heating cartridges with lower output. Be aware that higher current consumption than indicated can occur at higher air temperatures when the heat pump works with two heating cartridges at the same time. This can occur in the summer time and when large amounts of hot water are consumed. This can be avoided by disconnecting the heating cartridge during the summer time, under B.VALUE, EL BOILER MAXOUTPUT.

It is recommended that toroid-transformers are installed in order to eliminate the risk of overloading the main fuse. This means that the heating cartridges are disconnected in stages in event of risk of overloading. The toroid transformers are not standard, but sold as an option.

ExoTankAir is connected to ExoTrol using two pre-installed cables with multi-pole pin connectors (4 in total) and a lead-in panel with cable glands.
The cable length between ExoTrol and ExoTankAir is adapted by coiling the cables in the left hand corner of ExoTankAir. The cables are laid securely between ExoTrol and ExoTankAir.
The 4 connectors are connected to the corresponding points in ExoTankAir. Note that the 2 contacts that go to the heater cartridges are exchangeable, but they are marked 1 and 2; 1 is the upper and 2 the lower heating cartridge. The other 2 cannot be mixed up or incorrectly connected because of the design of the connector.
Figs 9,10 and 11.

Fig 9.

Front panel removed on ExoTank
for ExoAir/ ExoAir Polaris

Fig 10.

Connector ExoTank

Fig 11.

Top view of ExoTank and Shunt connected

Circulation pump between ExoTankAir and ExoAir is connected to screw terminals 12, 13 and earth in ExoTrol.

The sensors below are connected with cables for low voltage.

Room sensor is connected to screw terminals 5, 6 and 7 in ExoTrol. The room sensor is mounted in a central position in the largest room and where room temperature detection is relevant.

The outdoor sensor can be connected in two different places, depending on which suits the installation. In the heat pump on terminal 1 and 2, or in ExoTrol on the screw terminal 8 and 9.
The outdoor sensor must be installed facing north on an outside wall.

The outlet sensor is electrically preinstalled on ExoTankAir but must be installed on the inlet pipe at least 200 mm above the shunt valve and must be insulated externally. Figs 12.13 and 14.

Fig 12.

Fig 13.

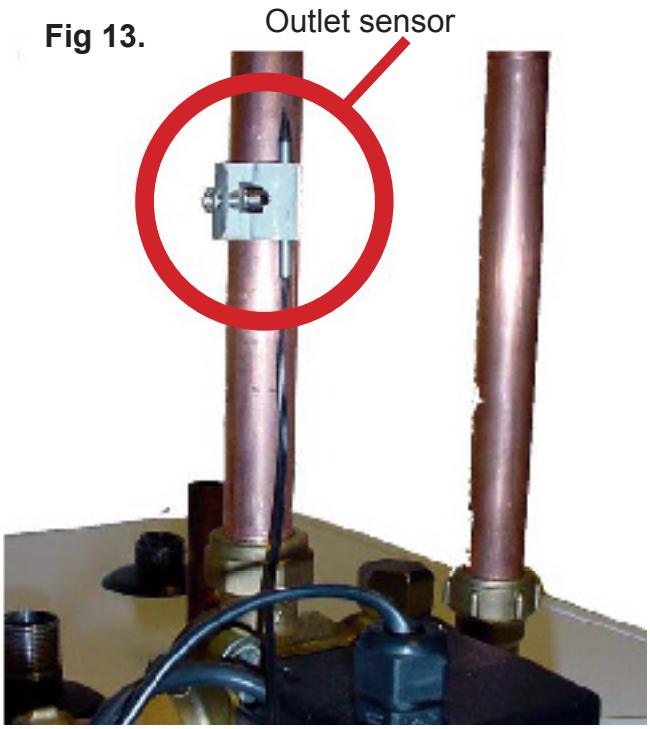
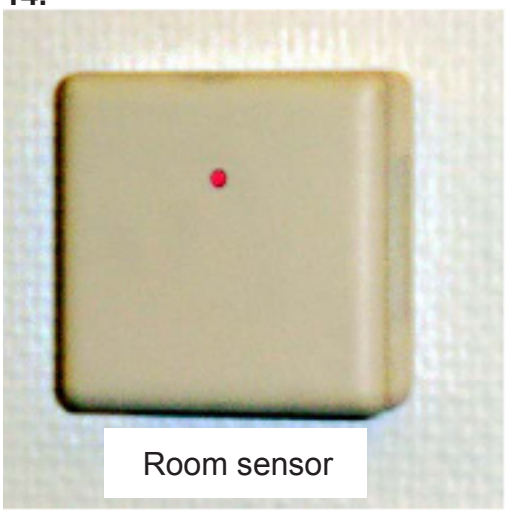


Fig 14.



Hot water sensor (HW sensor) is ready mounted in the upper section of ExoTankAir and electrically connected.

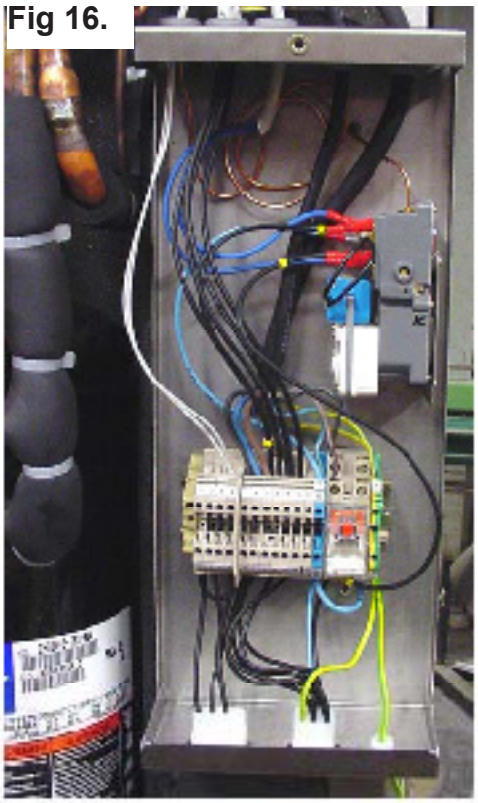
Heat pump sensor (HP sensor) is ready mounted in the lower section of ExoTankAir.
and electrically connected.

Shunt motor with intermediate position switch is pre-installed and electrically connected. The intermediate position switch must close in position 5 on the shunt; that is, half open.

ExoAir is connected to ExoTrol with the 2 cables provided each 15 m long.
In ExoAir's electrical cabinet there is a 9 pin male connector which is connected to the corresponding female connection of the 15 m cable. There is also a 4 pin male connector that is connected to the thinner 15 m cable's corresponding female connection. The connectors are designed so that they cannot be mixed up or incorrectly connected. The whole cable is then inserted through the appropriate cable gland in the bottom plate, under the electrical cabinet. The two cables are laid securely to ExoTrol indoors close to ExoTankAir. Figs 15 and 16.
On installation of ExoAir 16 an extra 2.5◘ EKK cable is used.

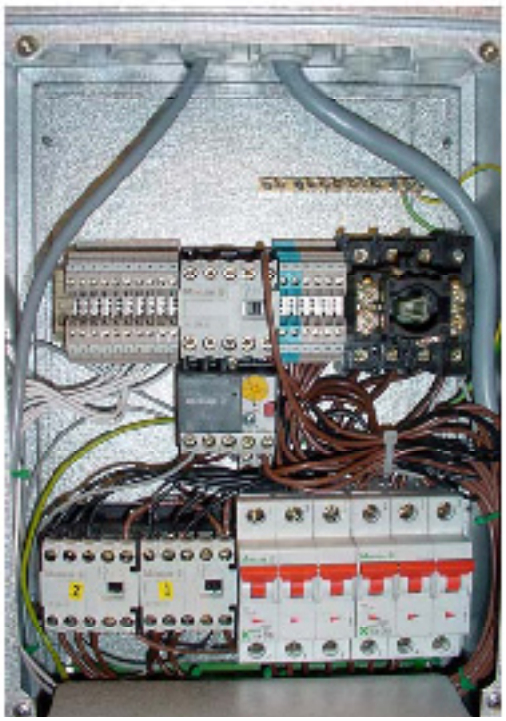
Fig 15.

Fig 16.



Connection in ExoTrol is as illustrated in the wiring diagram to the screw terminals and according to the wiring diagram terminals and cable designations. Fig 17.

Fig 17.

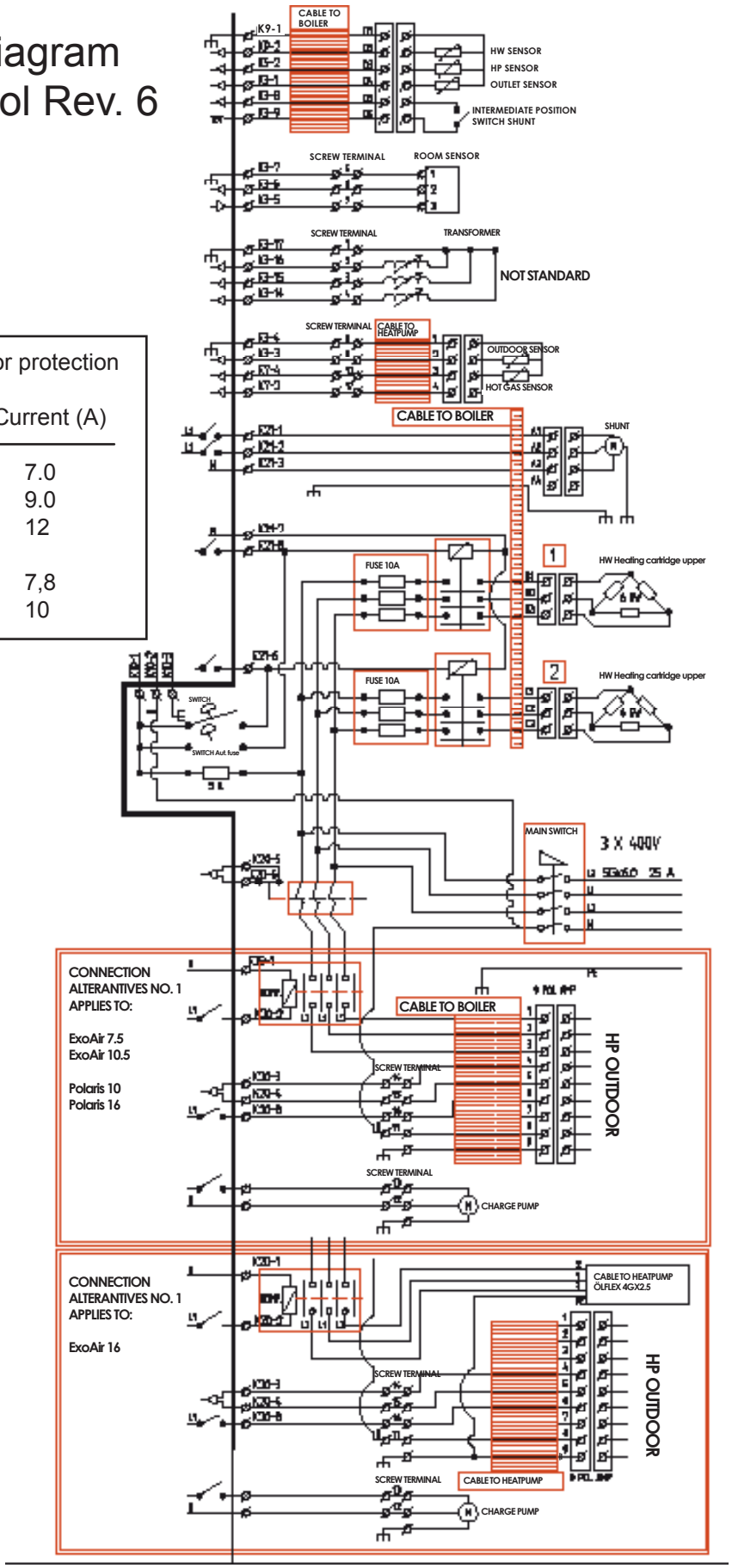


Exotrol with front panel removed / screw terminals, fuses

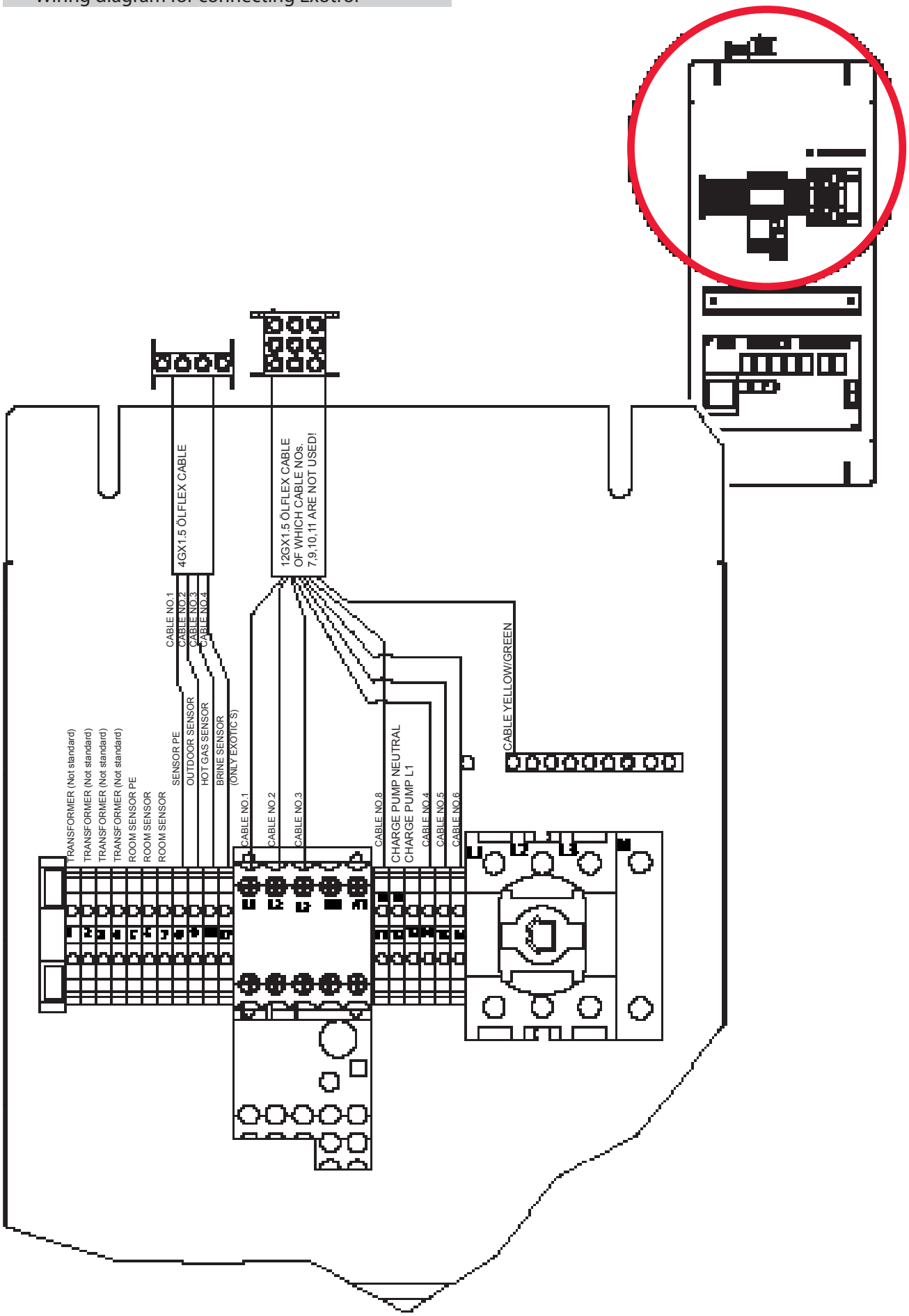
Wiring diagram

Wiring diagram for Exotrol Rev. 6

Table for motor protection	
Model	Current (A)
ExoAir 7.5	7.0
ExoAir 10.5	9.0
ExoAir 16	12
Polaris 10	7,8
Polaris 16	10

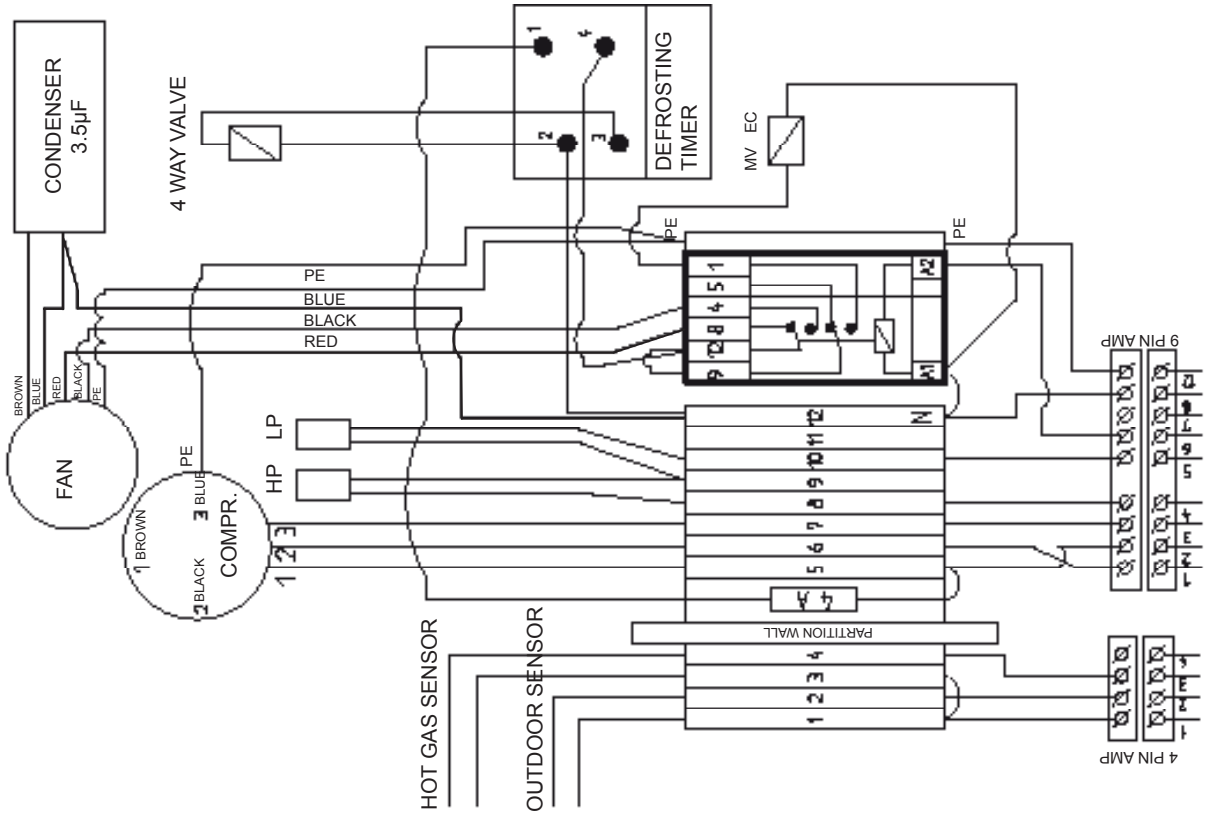


Wiring diagram for connecting Exotrol

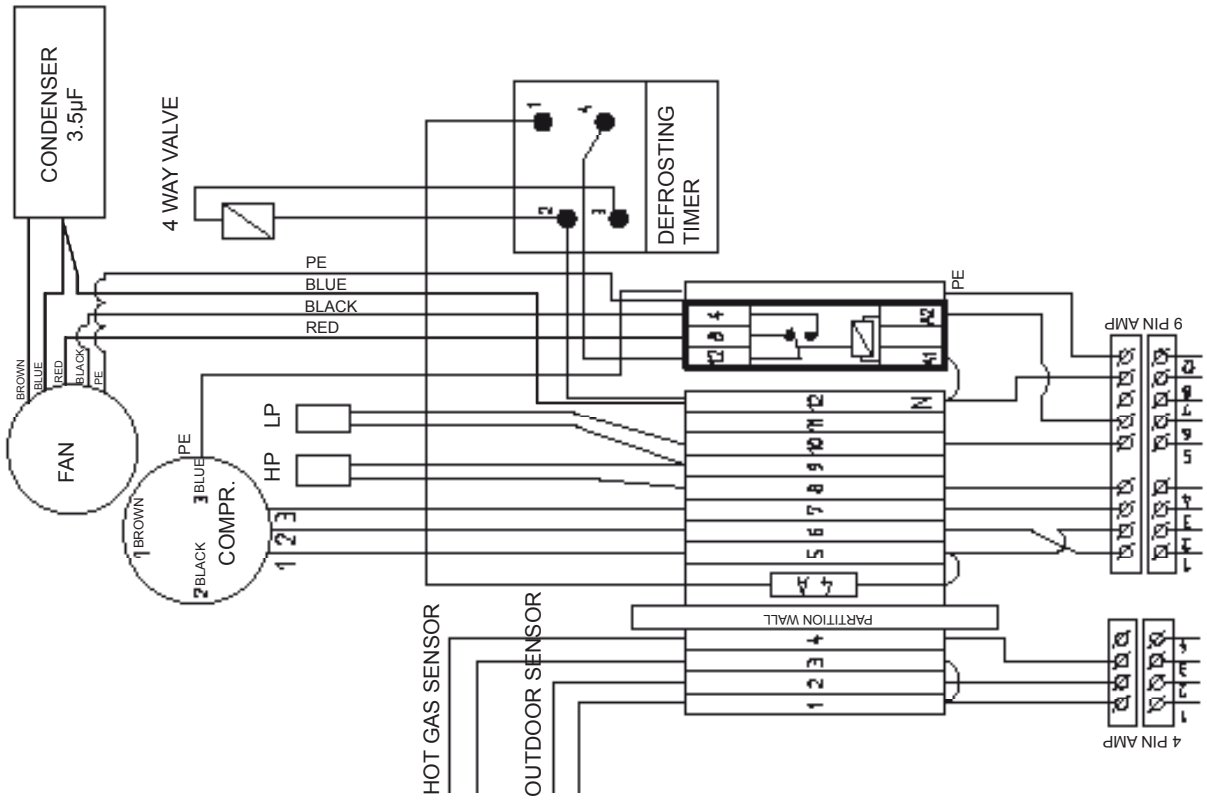


Wiring diagram in outdoor section

to heat pump Polaris 10/16 Rev.0



to the heat pump ExoAir 7.5/10.5 Rev.4



6 Technical description

ExoAir

ExoAir is an air/water heat pump designed for Nordic conditions with a long service life and high operational reliability.
The compressor is of the scroll type, manufactured by Copeland and is specially developed for heat pumps.
The fan is designed for low noise levels and high performance with two speeds.
The evaporator is made of epoxy painted aluminium discs with copper pipes with large areas for high performance and corrosion protection.
The condenser is made of stainless steel with large surfaces and extra large thermal length because of double channels.
Outer casing, stand and legs with all screws and rivets are stainless steel.
The control system controls and monitors the heat pump and additional heater.

ExoTrol

ExoTrol is a processor based control system with high capacity and flexibility for optimal control of the heat pump and supplementary heating, to minimise energy consumption and maximize heating comfort.

ExoTrol receives information from the following sensors:
Hw sensor at top of ExoTankAir
Hp sensor in lower section of ExoTankAir
Outlet sensor
Intermediate position switch in the shunt motor
Room sensor
Outdoor sensor

ExoTrol controls the following components:
Compressor
Fan 2 speeds
4 way valve
Defrosting (Defrosting timer built into heat pump's electrical cabinet)
Electric additional heating in 2 stages alternatively oil fired or other additional heater.
Shunt motor
Circulation pump for the heat pump

ExoTrol gives signal to alarm from different protective functions such as pressostats, motor protection and hot gas protection.

ExoTrol measures operating times and temperatures from the different sensors.

The room sensor can only limit the room temperature, it cannot increase it. Increase in the room temperature is achieved by adjusting the curve upwards. See Chapter 6 - Managing control panel and heat setting.

Control panel and display

Fig 18.

The control panel on ExoTrol

The control panel contains:
Display that shows text and digits for all functions and values.

Three touch buttons for menu resets, ”Enter” , movement in the menus and changing values. More detailed description under chapter 8, “Managing control panel and heat setting”.

Two LEDs. One indicates faults/errors in red. One indicates that the control system has power on in green.

Two switches. The upper for manual operation of the heating cartridge in the top of ExoTankAir El1. The lower for manual operation of the lower heating cartridge in ExoTankAir El2.

An automatic fuse 4A. That fuses the circuit board, fan, defrosting valve and operating circuits for the contactors. Reset by pressing the button.

7 Technical data

ExoAir's technical data is described below:

Fig 19.

Outlet temperature 35 °C												
Model	**7,5**				**10,5**				**16**			
Outdoor temperature °C	-10	0	10	20	-10	0	10	20	-10	0	10	20
Rated heating output kW	5,2	6,7	8,8	10,7	7,0	9,4	11,6	14,0	11,1	14,8	18,8	22,0
Supplied electrical output kW	1,7	1,8	2,0	2,1	2,4	2,6	2,7	2,8	3,7	4,0	4,3	4,5
Heating factor COP	3,0	3,7	4,4	5,1	2,9	3,6	4,3	5,0	3,0	3,7	4,4	4,8
Outlet temperature 50 °C												
Model	**7,5**				**10,5**				**16**			
Outdoor temperature °C	-10	0	10	20	-10	0	10	20	-10	0	10	20
Rated heating output kW	4,9	6,5	7,8	9,5	6,7	8,8	10,5	12,4	10,5	13,8	16,8	20,0
Supplied electrical output kW	2,3	2,4	2,5	2,7	3,2	3,4	3,5	3,7	4,5	4,9	5,1	5,3
Heating factor COP	2,2	2,7	3,1	3,5	2,1	2,6	3,0	3,4	2,3	2,8	3,3	3,8

Other data on EXOAIR			
Model	**7,5**	**10,5**	**16**
Refrigerant	R407c/1665g	R407c/2,100g	R407c/2,650g
Compressor Scroll			
Voltage	3x400V	3x400V	3x400V
Max operating current	6.5A	8.5A	13A
Soft start relay	Accessory	Accessory	Accessory
Start current	38A	48A	70A
Fan			
Air flow	3000 m^3/h	3,000 m^2/h	5,000 m^3/h
Voltage	230V	230V	230V
Max operating current	0.8A	0.8A	1.6A
Fuse	10A	10A	16A
Condenser			
Norm. water flow	900 l/h	1,200 l/h	1,600 l/h
Weight	135 kg	140 kg	185 kg
Outer dimensions			
Width	1086	1086	1086
Height	882-952	882-952	1212-1282
Depth	600	600	650

ExoAir Polaris technical data is described below:

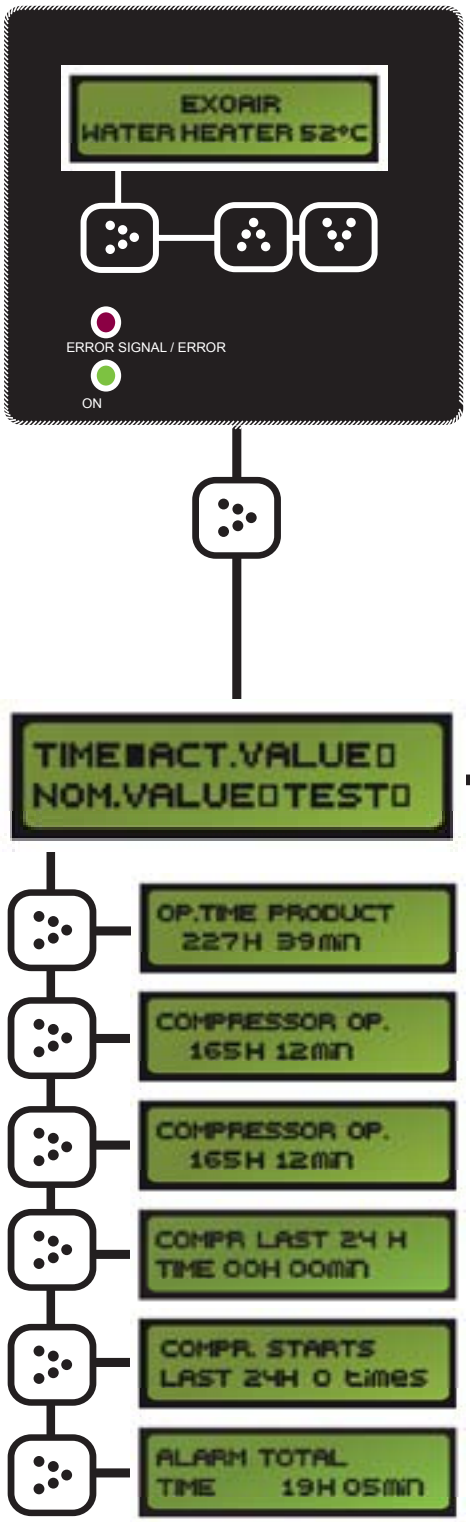
Fig 20.

Outlet temperature 35 °C	EXOAIR POLARIS														
Model	**10 with ExoNomizer**					**16 with ExoNomizer**					**20 with ExoNomizer**				
Outdoor temperature °C	-25	-10	0	10	20	-25	-10	0	10	20	-25	-10	0	10	20
Rated heating output kW	5,0	6,3	8,0	9,0	11,0	7,1	9,0	11,8	13,0	16,0	9,9	12,6	16,5	18,2	22,4
Supplied electrical output kW	1,9	2,1	2,3	2,4	2,6	2,5	2,7	3,1	3,2	3,3	3,9	4,2	4,8	5,0	5,1
Heating factor COP	2,6	3,0	3,5	3,9	4,2	2,9	3,3	3,8	4,2	4,5	2,6	3,0	3,4	3,8	4,1
Outlet temperature 50 °C	**EXOAIR POLARIS**														
Outdoor temperature °C	-25	-10	0	10	20	-25	-10	0	10	20	-25	-10	0	10	20
Rated heating output kW	5,1	6,5	8,1	9,2	11,0	7,5	9,5	12	13,5	17,0	10,5	13,3	16,8	18,9	23,8
Supplied electrical output kW	2,5	2,6	2,7	2,8	3,0	3,6	3,7	3,9	4,1	4,5	5,5	5,7	6,0	6,4	7,0
Heating factor COP	2,0	2,5	3,0	3,3	3,6	2,1	2,6	3,1	3,4	3,7	1,9	2,3	2,8	3,1	3,3

Other data on EXOAIR POLARIS			
Model	**10 with ExoNomizer**	**16 with ExoNomizer**	**20 with ExoNomizer**
Refrigerant	R404A / 2400g	R404A / 3,800 g	R404A / 3.8 kg
Compressor Scroll			
Voltage	3x400V	3x400V	3x400V
Max operating current	7.8A	10A	14A
Soft start relay	Accessory	Accessory	Accessory
Start current	40A	60A	70A
Fuse	10A	10A	16A
Fan			
Air flow	3000 m3/h	5000 m3/h	5000 m3/h
Voltage	230V	230V	230V
Condenser			
Nom. water flow	900 l/h	1,200 l/h	1700 l/h
Weight	140 kg	185 kg	190 kg
Outer dimensions			
Width	1,086 mm	1,086 mm	1,086 mm
Height	882-952	1212-1282 mm	1212-1282 mm
Depth	600 mm	650 mm	650 mm

Output information excl. circulation pump and defrosting.

8 Managing control panel and heat setting



Control panel

Use the control panel with display to obtain information and set the heating installation.
In normal mode, the display shows which heat pump is controlled and the temperature in the upper section of the tank, which prepares the hot water and peaks the outlet temperature to the radiators.

For ExoAir:

The main menu contains 4 sections:

1. Times (which displays the running times, number of starts etc.)
2. Actual.values (which display the present values of activated components and temperatures)
3. Nom. value (Nom. values = setting values)
4. Test (This mode allows one to manually activate the different components of the installation using the control panel)

Use the touch buttons

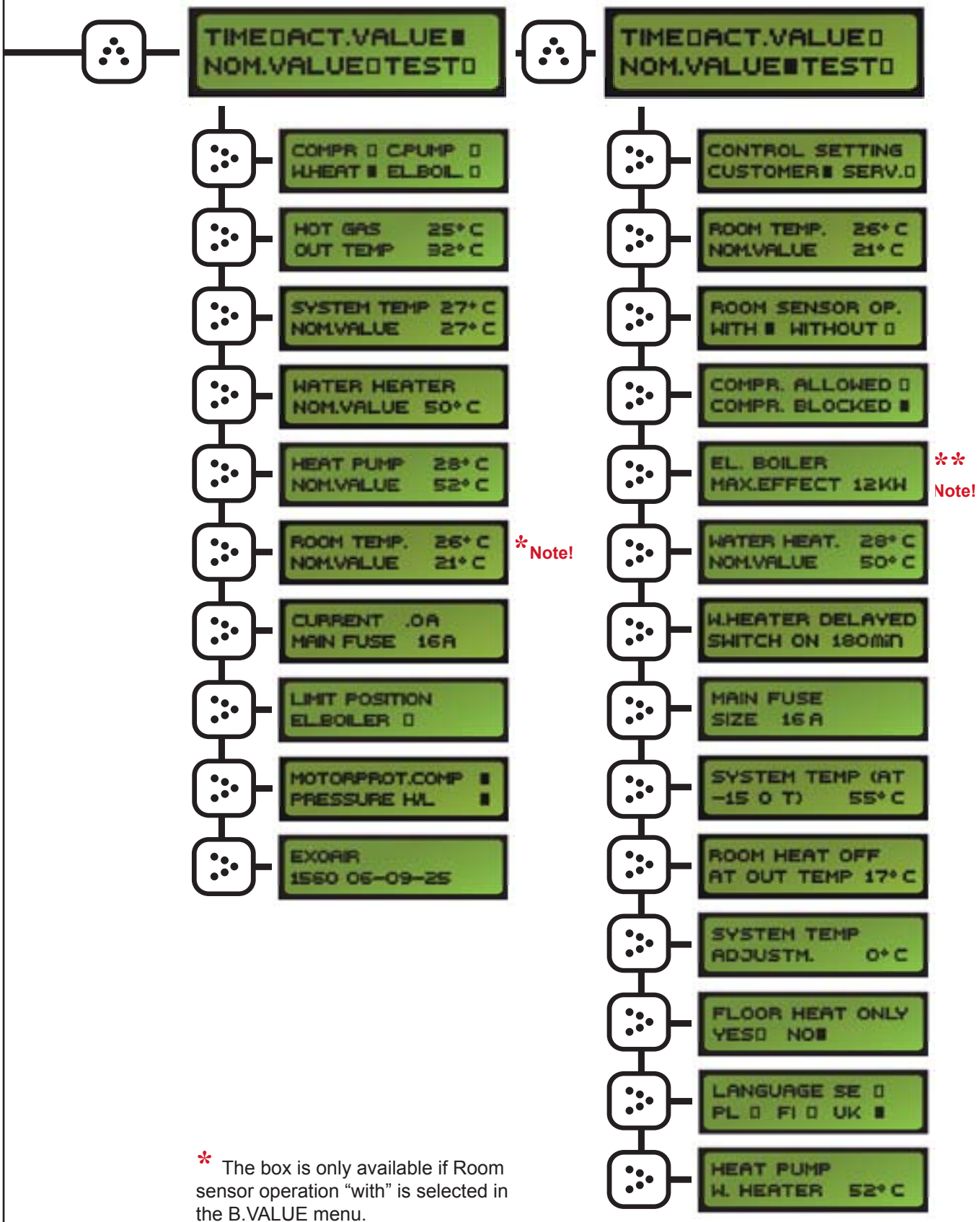
- Right button
- Up button / + button
- Down button / - button

to find the desired menu/parameter/setting.

Use the right button to change to a new/next menu/text box.

Use the up button to move to the next option in the menu (active function is marked by a filled box) or increase the value of the parameters / value that must be set.

Use the down button to reduce the value of the parameter to be set.

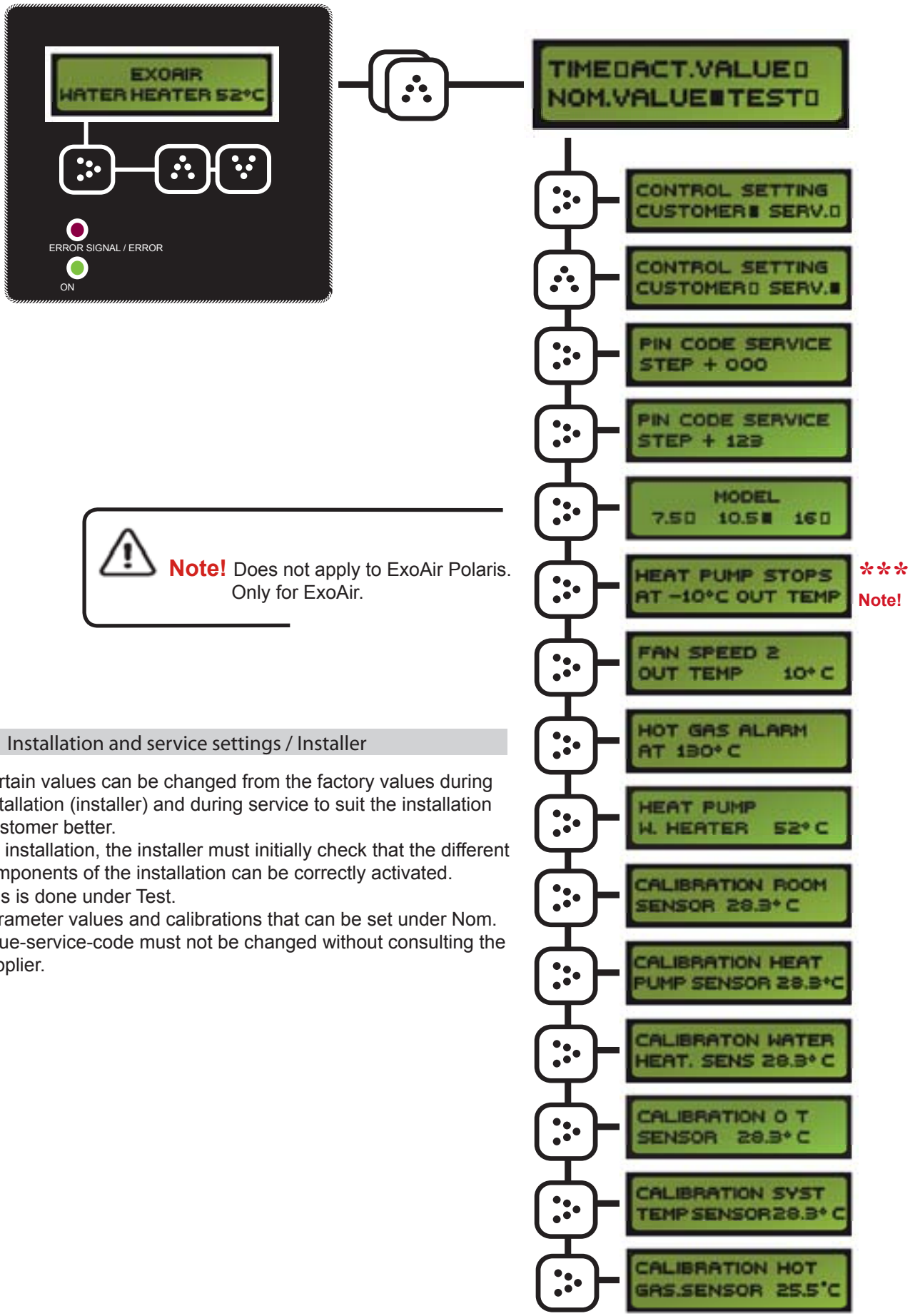


* Note!

** Note!

* The box is only available if Room sensor operation “with” is selected in the B.VALUE menu.

** For ExoAir 16 / Polaris 16 the max output is 9 kW.



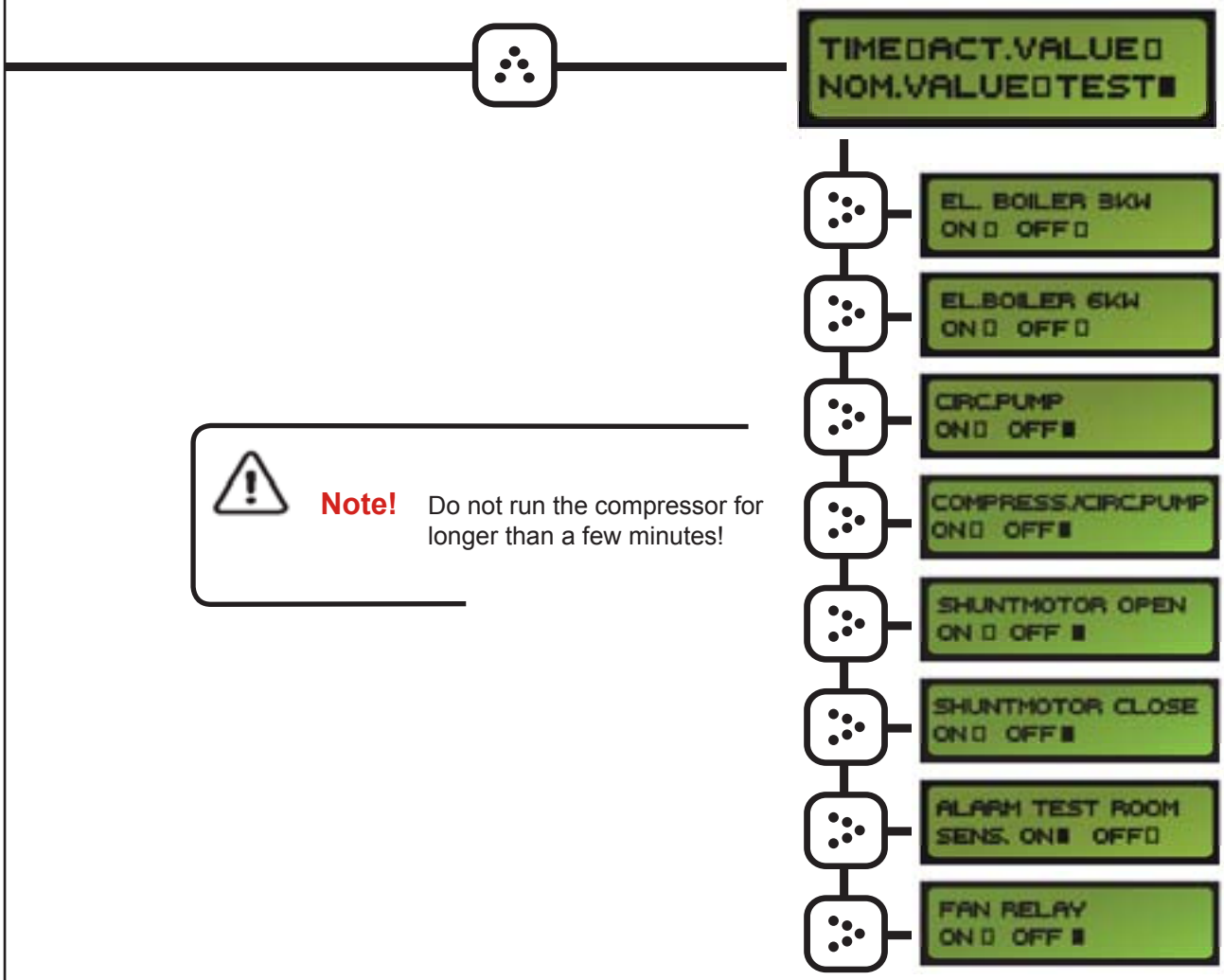
*** Note!

Note! Does not apply to ExoAir Polaris. Only for ExoAir.

Installation and service settings / Installer

Certain values can be changed from the factory values during installation (installer) and during service to suit the installation /customer better.
On installation, the installer must initially check that the different components of the installation can be correctly activated.
This is done under Test.
Parameter values and calibrations that can be set under Nom. value-service-code must not be changed without consulting the supplier.

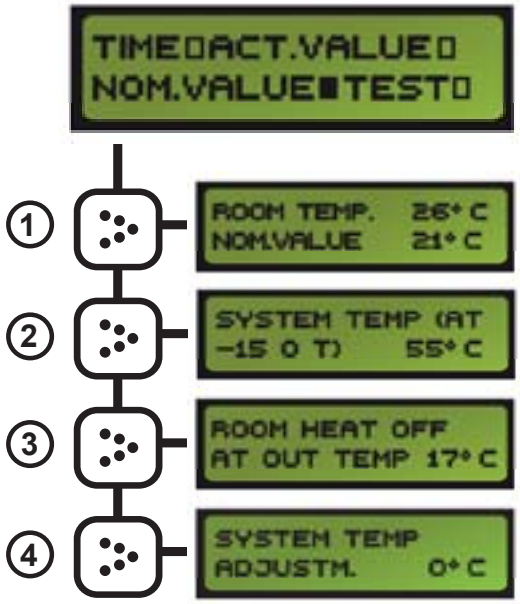
*** H.Pump is stopped at -25ºC for Polaris.



Note! Do not run the compressor for longer than a few minutes!

Heat setting

The temperature of the house is set by going to the room temperature setting in the Nom. value menu.

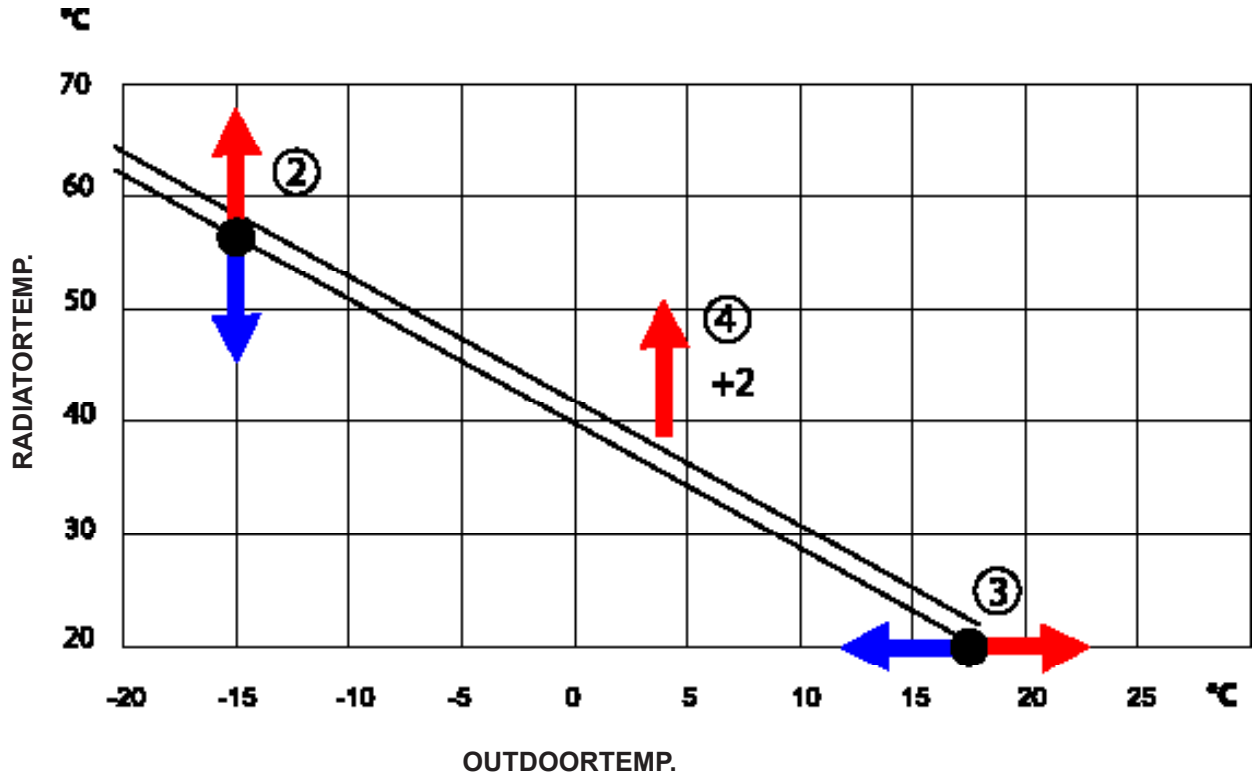


1. Set the nom. value to the desired temperature by using the up button to increase the temperature and the down button to decrease the temperature. Current value is displayed above. The room sensor can only lower the curve.

2.3.4. The radiator temperature that the house requires for heating is dependent on the outdoor temperature, that means low outdoor temperature requires high radiator temperature or high outdoor temperature, low radiator temperature. The curve that is required to control this is set in Nom. value. ***2.*** Outlet temperature at -15°C **3.** House heating from 18°C **4.** Outlet temp. adjusting X°C

If you want to heat the cellar radiators in summer time, point ③ should be moved to 25-30 °.

Curve Heat setting



9 Setting ranges and Preset values

	EEprom	Function	Range	Preset value
	EE00_X	Operating time comp 24 hr	0 > 1439 min	0
	EE01_X	Operation kWh comp 10/parts	0 > 9	0
	EE02_X	Operation kWh comp	0 > 32k kWh	0
	EE04_X	Operating time product operation hours	0 > 32k hr	0
	EE05_X	Operation kWh Heating cartridge 10/parts	0 > 9	0
	EE06_X	Operation kWh Heating cartridge kWh	0 > 32k kWh	0
	EE07_X	Operating time alarm hours	0 > 32k hr	0
	EE08_X	Operating time alarm minutes	0 > 59	0
	EE09_X	Operation number of comp starts 24 hr	0 > 255	0
	EE10_X	Operating time product in operating minutes	0 > 59	0
	EE16_X	Calibration Hot gas sensor	-3 > 3 Deg	0
	EE17_X	Nom. value fan speed 2	-15 > 10 Deg	10
	EE18_X	Nom. value for outlet temperature -15	20 > 80 Deg	55 Deg
	EE19_X	Nom. value HW heater	40 > 80 Deg	50 Deg
*	EE20_X	Nom. value outdoor temperature stop HP	-15 > 2 Deg	-10 Deg
	EE21_X	Nom. value Room temp	10 > 30 Deg	20 Deg
	EE22_X	Nom. value temp change timer	-10 > 10 Deg	0 Deg
	EE23_X	Nom. value Hot gas alarm	-110 > 140 Deg	130 Deg
**	EE24_X	Nom. value Max HP temp	40 > 57 Deg	52 Deg
	EE25_X	Nom. value House heating from outdoor temp	0 > 30 Deg	17 Deg
	EE26_X	Nom. value step limiter Heating cartridge	0 > 12 kW	12 kW
	EE27_X	Nom. value model selection	0 > 1	0
	EE28_X	Nom. value fuse size	10 > 55 A	10 A
	EE29_X	Nom. value adjustment outlet temperature.	-10 > 10 Deg	0 Deg
	EE30_X	Nom. value min temp HP	20 > max 5 Deg	35 Deg
	EE31_X	HP permitted to start	0 > 1	0
	EE32_X	Calibration HP sensor	-3 > 3 Deg	0
	EE33_X	Calibration HW heater sensors	-3 > 3 Deg	0
	EE34_X	Nom. value max outlet floor heating	20 > 60 Deg	25 Deg
	EE35_X	Nom. value floor heating	0 > 1	0
	EE36_X	Nom. value wait electric boiler saving mode	0 > 254 Min	180 minutes
	EE37_X	Nom. value room sensor	0 > 1	0
	EE38_X	Calibrating outdoor sensor	-3 > 3 Deg	0
	EE39_X	Calibrating Outlet sensor	-3 > 3 Deg	0
	EE40_X	Calibrating Room sensor	-3 > 3 Deg	0

*) For ExoAir Polaris the Preset values -25 Deg and Range -30 Deg > -2 Deg apply.

**) For ExoAir Polaris the Preset value 55 Deg applies.

10 Alarm

If any of ExoAir´s protective functions are activated and shut down the heat pump, a red light flashes on the room sensor and the electrical cabinet display shows what protective function it applies to in clear text, see separate list of alarms with explanations.
Alarms are reset by pressing the left button with the arrow symbol on the display to the right . If the alarm is still active it cannot be reset.

ALARM TEXTS		
NO WATER IN EL. BOILER	COMPRESSOR PHASE SEQUENCE ERROR	TEST OF WATER IN EL. BOILER IN PROGRESS
OUTLET SENSOR ER-ROR	HOT GAS SENSOR FAULT	HEAT PUMP SENSOR FAULT
ROOM SENSOR ER-ROR	SENSOR HW HEATER ERROR	OUTDOOR SENSOR ERROR
MOTOR PROTECTION COMPRESSOR RESET	PRESSOSTAT H/L COMPRESSOR RESET	HOUSE HEATING FROM OUTDOOR TEMP ###€
HIGH HOTGAS TEMP COMPR ###€ RESET	TOO HIGH EL SOCKET EL.P# HW.HEAT$	CONTACT SERVICE ALARM RESET
COMPRESSOR SHUT OFF	LOW OUTDOOR TEMP ###€ H.PUMP STOPPED	COMPRESSOR AND ELECTRIC HEATER SHUT OFF
START DELAY H.PUMP ON		

11 Remedial action in event of interrupted operation

If the **hot gas protection** has tripped it can be reset. If the fault recurs within 24 hours contact service.

If the **motor protection** has tripped it can be reset. The cause may be a phase or power cut. Check the fuses in the electrical cabinet. If the motor protection has tripped despite all phases being intact, contact service.

If the **high pressure pressostat** has tripped it can be reset. The cause of this could be that the water circulation between the heat pump and tank/boiler has stopped or is too low.
Check the circulation pump and dirt filter and that the water circuit is vented, otherwise contact service.

If the **low pressure pressostat** has tripped it can be reset. The cause could be lack of refrigerant, or that the fan is stationary.
Check that the sight glass is ”clean ” without bubbles when the heat pump is running. Contact service.

If **sensor fault** is indicated contact service. Does not apply to outdoor sensors in summertime – it is probably sunlit anyway.

Tips for troubleshooting

When fault-tracing, always start by checking if there is an alarm text in the text display.
Continue by reading off all actual values; note each value and status.
Test that all outputs function with the help of the text panel.
Always check this before opening and progressing to the source of the problem.

12 Maintenance and checks

Exoair has a casing and inner panels of stainless steel 2333. This gives very good protection against corrosion. Discoloration of the panels may occur in conditions with significant chemical air pollution in conjunction with rain and certain coastal areas. We recommend, therefore, that the casing is rinsed with clean water once a month. If discoloration occurs it can be removed using Avesta OriginalFinish™ Rust Remover, that can be ordered from Euronom.
In our experience this only happens at a few, and limited, locations.

Avesta OriginalFinish™– Rust Remover
Avesta OriginalFinish™ - Rust Remover can be ordered from Euronom

During the cold times of the year, ice can build up under the heat pump. This is completely normal and need not be remedied. In conjunction with defrosting, the evaporator/cooling coil is heated and when defrosting stops and the pump returns to normal heating operation, hot humid air is blown out to start with, which results in a white cloud of steam. This is also completely normal.

Check that the air can pass the heat pump without any obstruction, such as leaves etc.
Check annually that the sight glass is clean without bubbles when the heat pump is running. If there are bubbles it may be due to a lack of refrigerant. Contact service.

Condensation run-off usually soaks away into the ground and is absorbed by the house drainage. Check that there is no moisture penetration.

Check the dirt filter if necessary.

13 Manual operation of heating cartridges and shunts

If the heat pump and/or automatic does not function, ExoTank can still heat the house and hot water. Do as follows:

1. On the control panel of the electrical cabinet there are 2 red switches. The upper switch is for the upper heating cartridge 6 kW (3 kW) and the lower is for the lower heating cartridge 6 kW, that can be set in the upper position.
A lamp lights in the switch and the heating cartridge is activated.
Note! For ExoAir Polaris, the heating cartridge 1 (3 kW/6 kW) and heating cartridge 2 (6 kW) are both installed in the upper section of the tank. See Fig. 9.

2. Reset the shunt motor from automatic mode by pressing in the knob and then turning to the desired position. The blue red scale indicates how open the valve is. **Max blue »** closed valve **»** no heating and **max red »** open valve **»** max heating. By turning the knob so that it springs out the motor is reset to automatic mode.

This must be carried out manually as long as the automatic does not function, that is while the shunt valve mode is adapted to the outdoor temperature and desired room temperature.

Fig 21.

Control panel on ExoTrol

Shunt motor with knob

14 Function description of control EXOAIR/EXOAIR POLARIS, EXOTROL and EXOTANK VPS

Compressor operation

Conditions for start:

a. The temperature in the lower section of the VPS tank is below the nom. value by 5 °C, which is hysteresis for on and off.

b. The start timer switches on 10 minutes after the compressor has stopped. (The compressor cannot start more often than every 10 minutes to avoid over loading that can result in total failure.)

c. During the test that checks that there is water in the VPS tank, which occurs for 185 seconds after mains voltage interruption. If the test should give the alarm that there is no water in the VPS tank, start is blocked.

d. For hot gas temperatures over the set alarm level (130°C), the compressor is stopped and the alarm must be manually reset on restart.

e. When the outdoor temperature has fallen below the nom. value (-10°C, for ExoAir) the compressor is stopped and text. Low outdoor temp HP stopped is displayed. Restarts automatically when the outdoor temperature has increased above the set nom. value +1°C (-9°C).

f. When the motor protection has tripped because of too high current load, the compressor is stopped. Alarm motorprotection is displayed and manual reset is required for a restart. If the fault recurs contact service.

g. When the pressostat in the refrigerant circuit is activated for low or high pressure, the compressor is stopped.
Alarm pressostat is displayed and must be manually reset for a restart. If the fault recurs contact service.

h. The following temperature sensor faults stop the compressor, the hot gas sensor, the HP sensor and the Outlet sensor

i. In the nom. value customer, there is a menu where one can block the compressor start. At new delivery it is always blocked.

Charge pump between HP and VPS tank

a. The pump runs when the compressor is on with 30 second over run. When the compressor has stopped because of low outdoor temperature the pump runs the whole time.

b. When the outdoor temperature is between 0<-10 deg the pump always runs at least 30%, that is 5 minutes every 15 minutes.
Note! For Polaris: The pump always runs when the temperature is below - 10 Deg.

Checking phases sequence

The fan runs when the compressor is on. The pump runs at high speed 2 when the outdoor temperature is below the set value. (The fan remains stationary during the defrosting cycle)

Fan control

Check that the compressor rotates in the correct direction. From the start, a time delay of 50 seconds begins, after this time the hot gas must have risen by at least 3 Deg calculated from the temperature at the start. If not, there is a phase sequence error alarm and the compressor is stopped and cannot restart without the voltage being switched off.

Testing water in VPS tank

After the product has been supplied with voltage there is a time delay of 5 seconds then the upper heating cartridge is activated for 60 seconds. If the maximum output of the heating cartridges has been set to 0 the test is not carried out. If the temperature for the HW sensor in the upper section of the VPS tank has increased by more than 3 Deg after 185 seconds the no water in the VPS tank alarm is displayed. In the event of an alarm, both the heat pump and heating cartridge are blocked. Remedy check the venting and fill with water.

Temperature sensor alarm

Hot gas sensor

Open circuits in the sensors are not measured continually but first when the compressor has been operating for 250 seconds from the start. If it is 0 °C or colder it will give a sensor alarm. The test is repeated at every compressor start. There is an alarm for a short circuited sensor if the temperature is above 135 °C. In event of sensor errors, the sensor must be replaced to reset the alarm.

Outlet sensor, HW.heater sensor and HP sensor

Open circuit in sensor when temperature is below 0 °C. There is an alarm for a short circuited sensor if the temperature is above 87 °C. In event of sensor errors, the sensor must be replaced to reset the alarm.

Room sensor

Open circuit in sensor when temperature is below 0 °C. There is an alarm for a short circuited sensor if the temperature is above 37 °C. In event of sensor errors, the sensor must be replaced to reset the alarm.

Outdoor sensor

Open circuit in sensor when temperature is below -51 °C. There is an alarm for a short circuited sensor if the temperature is above 37 °C. In event of sensor errors, the sensor must be replaced to reset the alarm.

Calibrating temperature sensor

If necessary, it is possible to calibrate all sensors. In the menu service settings there is a menu for each sensor. Set to the desired temperature using the + and – buttons. Use another temperature instrument and adjust until the control display corresponds to it. It can be adjusted
+ - 6 °C. The hot gas sensor must be adjusted at a temperature exceeding +50°C because of the measurement range. The others must be adjusted at normal operating temperatures.

Electric boiler

ExoAir & ExoAir Polaris

Nom. value for HP / Electric boiler (Auxiliary heat)

The upper section of the tank functions as an electric boiler and has 2 x heating cartridges. Heating cartridge 1 has an output of 3 kW or
6 kW. Heating cartridge 2 has an output of 6 kW. If heating cartridge 1 has an output of 3 kW and heating cartridge 2 has an output of 6 kW the steps 0, 3, 6 and 9 kW are available.
If heating cartridge 1 has an output of 6 kW and heating cartridge 2 has an output of 6 kW, steps 0, 6 and 12 kW are available.
The heating cartridges are controlled as follows: The nom. value for the electric boiler is set in the menu B.VALUE with sub menu
HW.HEATER NOM. VALUE.
For example 50 °C: Heating cartridge 1 then receives the nom. point value 50°C and heating cartridge 2 receives the nom. value 48 °C, that is 2 K lower nom. value than that set. Both heating cartridges work with 5 K hysteresis; the temperature difference between on and off. This control principle requires an increase of input power according to requirement.
If the Nom. curve heat setting according to page 23 is higher than nom. value set above, the electric boiler is heated to that value.

Step limiter heating cartridges in the VPS tank

The maximum permitted electrical output to the heating cartridges can be set using the step limiter. Under NOM.VALUE with sub-menu EL. BOILER MAX EFFECT one can set 0, 3, 6, 9 and 12 kW max connection output for the heating cartridges.

Load monitor

When using the load monitor, the control measures maximum current in one of the phases that supplies the house. When the maximum current exceeds the set nom. value the control first switches off the Electric boiler (reserve heating) lower heating cartridge if it is active. If that is not sufficient the heat cartridge in the upper section of the VPS tank is disconnected. Reconnection occurs when 10 amperes are available for each respective heating cartridge. If the load monitor prevents connection, this is shown in the text display. The heat pump is not affected by the load monitor.

Nom. value for outlet temperature

Heat curve for HP/Electric boiler (reserve heating) in the lower section of the VPS tank is controlled by the outdoor temperature. Setting occurs at two points. At -15 °C outdoor temperature, one sets the desired temperature for the outlet in the radiator circuit. At the second point, one sets the outdoor temperature at which one wants the house heating to switch off = 20ºC outlet temp.
There is also the opportunity to adjust the temperature with parallel adjustment.
When selecting floor heating, a fixed nom. value is set for the outlet temperature, it is not affected by any other parameters except house heating off.

Room sensor control

When one uses the room sensor, it can reduce the nom. value in the outlet provided that the room temperature is above the room nom. value. Control range for the room sensor lies within +- 0.5 °C.
When floor heating is selected, the room sensor does not function.

Shunt control

The shunt motor is controlled using two outputs, one that opens and one that closes. The control is determined by nom. value and actual value of the outlet sensor. When nom. and actual values are within 1 °C, the shunt is stationary. The shunt can change position within a period of 60 seconds. If the temperature deviation is >+0.5 °C the shunt closes with 2 seconds and is stationary for 58 seconds. If the deviation is 12 deg. the shunt is on for 60 seconds. The On time is linear in-between dependent on the temperature deviation.
When the outdoor temperature is above that selected for house heating, the shunt closes continuously.

Additional heat from heating cartridge in VPS tank in upper section of radiator circuit

When the shunt has opened so the shunt parameter limit has been affected, the shunt stops. If the parameter limit is still affected after the time selected for NOM.VALUE/W. HEATER DELAYED switch on, the shunt will open for the water in the upper section of the VPS tank.

Operating gauge

Measurement of operating compressor is the total time that the compressor has been active. Displayed in hours and minutes. Measurement occurs every minute.

Measurement of operation electric boiler is made in kWh. Measurement occurs every minute and is displayed in kWh and the output that is engaged. This is not an exact measurement of the output but is based on the average value of the load.
Max measurement range 320000 kWh.

Measurement of alarm time is the total time that the installation has a stop alarm. Displayed in hours and minutes.

Measurement of on time is the total time that the installation has received voltage. Displayed in hours and minutes max 32000 hours.

Number of compressor starts is the number of starts in the last 24 hour period. Period means 24 hours from an unknown start and stop time during the day this start time starts at power on.

Compressor operation last 24 hour period. Measurement period is the same as for the number of compressor starts. Displayed in hours and minutes.

Compressor operation ongoing period. Displayed in hours and minutes.

Quick store of delivery settings

Quick save of the nom. value can occur on delivery setting. The nom. value that is under the menu customer setting is made by pressing the panel's increase and reduce buttons at the same time for at least 5 seconds. Text appears that shows saving the delivery setting.
The nom. values found during service. Enter the code for service mode and then press all three of the panel's buttons for at least 5 seconds at the same time. Text appears that displays that storage of delivery setting has occurred.

Resetting operating gauge

All operating gauges can be reset at the same time. Read in the code for service mode and then press the panel's enter and reduce button for at least 5 seconds. Text appears stating that resetting has occurred.

Alarm contact service

When there have been 4 alarms within 24 hours, an alarm with the text Contact service is displayed.

Setting model selection

This setting selects which model of pump has been installed (7.5, 10.5 or 16). It only affects the power measurement of the compressor. Set under NOM.VALUE/service/model selection. Does not apply to Polaris.

Testing outputs

Selecting the Test menu closes all the outputs in off mode. To test if the different components function, scroll forward to the text for the output to be tested. Press the increase button the output is to check if the unit functions. Press the reduce button and the output switches off. Repeat this until one has established if all the units function correctly. This option is used for troubleshooting and is not a normal operating mode.

Temperature sensor-resistance values kOhm at different temperatures

Table resistance thermistor Exoair applies to all the sensors except Hot gas sensor.
Note! When measuring resistance on the sensor it must be disconnected from the connection to the control cabinet.

Temperature	Resistance
-20	16.3k
-15	12.6k
-10	10k
-5	7.8k
0	6.2k
5	4.9k
10	4k
15	3.2k
20	2.6k
25	2.2k
30	1.8k
35	1.5k
40	1.2k
45	1k
50	0.8k
55	0.7k

Hot gas sensor

Temperature	Resistance
0	
10	16.3k
20	12.6k
30	10k
40	7.8k
50	6.2k
60	4.9k
70	4k
80	3.2k
90	2.6k
100	2.2k
110	1.8k
120	1.5k
130	1.2k

15 Check list commissioning ExoAir

☐ **1.** Check that the outlet (pos. 1 fig. 6) is connected to the rear connection on the hp seen from the front.

☐ **2.** The charge pump (CP fig. 6) with the arrow to the hp, is set at speed 3 and is the Grundfoss type UPS 25-60 for ExoAir 7.5-10.5 and UPS 25-80 for ExoAir 16

☐ **3.** Check that the outlet + return to the heating circuit are correctly connected (pos. 6-7 fig. 6). Set the heat circuit pump to as low a speed as one deems possible in order to obtain a suitable Δt.

☐ **4.** Check that venting is carried out at the top of the tank (for example, exp conn fig. 6) and exchanger in hp (pos. 15 fig. 1).

☐ **5.** Check the pressure in the exp tank— should be 0.5 bar.

☐ **6.** Check the operating pressure in the heating circuit — should be 1.0 bar for a closed circuit.

☐ **7.** Check that the power supply to ExoTrol in the central group is fused with a 25A slow fuse at the VPS tank with a 12 kW electrical output. With a 9 kW electrical output in the VPS tank, ExoTrol must be fused with at least a 20A slow fuse in the electrical cabinet (Table page 8). The main fuse of the house must be at least the same size as the electrical cabinet.

☐ **8.** Check that the outlet sensor (fig. 13) is installed on the outlet line with the metal clip supplied and is insulated.

☐ **9.** Check that the outdoor sensor is connected on terminal block 1-2 in the hp or terminal block 8-9 in ExoTrol.
Note! If the outdoor sensor is connected on terminal block 8-9 in the ExoTrol the cables to the HP must remain on terminal block 8-9.

☐ **10.** Check that the rooms sensor is installed centrally in the housing. Must be connected to terminal block 5-7 in ExoTrol. The room sensor should be installed even if one does not intend to use it for temperature limitation, because the alarm LED is interesting (fig. 14).

☐ **11.** Check that the temperature limiters in the heating cartridges have not triggered by resetting using a screwdriver or similar. Significant pressure is required. Set 70°C on the thermostats on both heating cartridges.

☐ **12.** Check that the toroid-transformers (accessory) are installed on terminal block 1-4 in ExoTrol.

☐ **13.** Check that the motor protection is correctly installed for the size of ExoAir. The size is stated on the type plate located in the compressor area on the right side of ExoAir.
ExoAir 7.5=7A 10.5=9A 16=12A

☐ **14.** Only ExoAir 16:
Check that the supplied extra 2.5□ cable is connected according to a separate instruction.
ExoTrol must also have contactors and motor protection set for 12A.

☐ **15.** Check that the thin cable from ExoTrol to HP is connected on terminal block 8(1), 9(2), 10(3).

☐ **16.** Check that the thick cable is connected in ExoTrol to contactor K20 L3(1), L2(2), L1(3) and on terminal block 14(4), 15(5), 16(6), 11(8), ground (y/g). Cable 7 must not be used.

☐ **17.** Check that the charge pump is connected to terminal block 12-13 in ExoTrol.

☐ **18.** Turn the main switch on ExoTrol and check that the green ON lamp illuminates. If the lamp does not illuminate, check the 3 fuses in the electrical cabinet and press in the automatic fuse (fig. 18) on ExoTrol.

☐ **19.** Check that the red Error lamp does not illuminate on ExoTrol. If the red Error lamp illuminates, check which alarm is active in the display. Normal text in this display in this mode is

☐ **20.** Check which size of ExoAir is installed (is on the type plate on the right side of the hp).
On delivery, all ExoTrols are set to ExoAir 7.5. If the wrong size is set it can be changed as follows:

(A) enter the main menu using the right button and

(B) move the cursor using the up button on

(C) press in right button so that one enters the sub-menu

(D) Select Service with confirm with

(D) enter PIN code 123 with confirm with

(E) move the marker with the upwards button to the relevant model choice

(G) to leave the menu hold the right button pressed for several seconds

☐ **21.** Check that the values under the heading ”Heat setting” page 23 are suitable for the relevant installation. With floor heating there is the possibility of setting a max temp.

☐ **22.** Set

in the main menu under

to the correct value that the relevant VPS tank has.

☐ **23.** Set the correct size (see point 12) on the main fuse under

sub menu

. Use the up button or the down button .

☐ **24.** Go into the main menu under the heading

and move down the sub-menu to

and move the marker with the up button to

.

☐ **25.** ExoTrol now runs through a check program which checks that there is water in the VPS tank and that the compressor is rotating in the correct direction.
If the compressor rotates in the wrong direction there is a “phase sequence alarm”.
To rectify this, one must break the power supply at the electrical cabinet and 2 close phases must be swapped in ExoTrol. ExoTrol repeats the check program again.

☐ **26.** Venting the HP (pos. 15 fig. 1) should be checked after operating for a short time.

☐ **27.** The dirt filter (fig. 6) should be checked and cleaned if necessary after several days operation.

☐ **28.** Note the following information (preferably with a pencil):

Size ExoAir _____

Electrical output in the VPS tank _____

Main fuse _____

Plumbing and heating contractor _____

_____

_____

Electrician _____

_____

_____

Commissioning date _____

16 Check list commissioning ExoAir Polaris

☐ **1.** Check that the outlet (pos. 1 fig. 6) is connected to the front connection on the hp seen from the front.

☐ **2.** The charge pump (CP fig. 6) with the arrow to the hp, is set at speed 3 and is the Grundfoss type UPS 25-60 for ExoAir Polaris 10 and UPS 25-80 for ExoAir Polaris 16.

☐ **3.** Check that the outlet + return to the heating circuit are correctly connected (pos. 6-7 fig. 6). Set the heat circuit pump to as low a speed as one deems possible in order to obtain a suitable Δt.

☐ **4.** Check that venting is carried out at the top of the tank (for example, exp conn fig. 6) and exchanger in hp (pos. 15 fig. 3).

☐ **5.** Check the pressure in the exp tank— should be 0.5 bar.

☐ **6.** Check the operating pressure in the heating circuit — should be 1.0 bar for a closed circuit.

☐ **7.** Check that the power supply to ExoTrol in the central group is fused with a 25A slow fuse at the VPS tank with a 12 kW electrical output. With a 9 kW electrical output in the VPS tank, ExoTrol must be fused with at least a 20A slow fuse in the electrical cabinet (Table page 8). The main fuse of the house must be at least the same size as in the electrical cabinet.

☐ **8.** Check that the outlet sensor (fig. 13) is installed on the outlet line with the metal clip supplied and is insulated.

☐ **9.** Check that the outdoor sensor is connected on terminal block 1-2 in the hp or terminal block 8-9 in ExoTrol.
Note! If the outdoor sensor is connected on terminal block 8-9 in the ExoTrol the cables to the HP must remain on terminal block 8-9.

☐ **10.** Check that the rooms sensor is installed centrally in the housing. Must be connected to terminal block 5-7 in ExoTrol. The room sensor should be installed even if one does not intend to use it for temperature limitation, because the alarm LED is interesting (fig. 14).

☐ **11.** Check that the temperature limiters in the heating cartridges have not triggered by resetting using a screwdriver or similar. Significant pressure is required. Set 70°C on the thermostats on both heating cartridges.

☐ **12.** Check that the toroid-transformers (accessory) are installed on terminal block 1-4 in ExoTrol.

☐ **13.** Check that the motor protection is correctly installed for the size of ExoAir. The size is stated on the type plate located in the compressor area on the right side of ExoAir.
ExoAir Polaris 10=7.8A 16=10A

☐ **14.** Only ExoAir Polaris 16:
ExoTrol must have contactors and motor protection set for 10A.

☐ **15.** Check that the thin cable from ExoTrol to HP is connected on terminal block 8(1), 9(2), 10(3).

☐ **16.** Check that the thick cable is connected in ExoTrol to contactor K20 L3(1), L2(2), L1(3) and on terminal block 14(4), 15(5), 16(6), 11(8), ground (y/g). Cable 7 must not be used.

☐ **17.** Check that the charge pump is connected to terminal block 12-13 in ExoTrol.

☐ **18.** Turn the main switch on ExoTrol and check that the green ON lamp illuminates. If the lamp does not illuminate, check the 3 fuses in the electrical cabinet and press in the automatic fuse (fig. 18) on ExoTrol.

☐ **19.** Check that the red Error lamp does not illuminate on ExoTrol. If the red Error lamp illuminates, check which alarm is active in the display. Normal text in this display in this mode is

☐ **20.** Check that the values under the heading ”Heat setting” page 23 are suitable for the relevant installation. With floor heating there is the possibility of setting a max temp.

☐ **21.** Set

in the main menu under

to the correct value that the relevant VPS tank has.

☐ **22.** Set the correct size (see point 12) on the main fuse under

sub menu

. Use the up button or the down button .

☐ **23.** Go into the main menu under the heading

and move down the sub-menu to

and move the marker with the up button to

.

☐ **24.** ExoTrol now runs through a check program which checks that there is water in the VPS tank and that the compressor is rotating in the correct direction.
If the compressor rotates in the wrong direction there is a “phase sequence alarm”.
To rectify this, one must break the power supply at the electrical cabinet and 2 close phases must be swapped in ExoTrol. ExoTrol repeats the check program again.

☐ **25.** Venting the HP (pos. 15 fig. 3) should be checked after operating for a short time.

☐ **26.** The dirt filter (fig. 6) should be checked and cleaned if necessary after several days operation.

☐ **27.** Note the following information (preferably with a pencil):

Size ExoAir Polaris _____

Electrical output in the VPS tank _____

Main fuse _____

Plumbing and heating contractor _____

_____

Electrician _____

Commissioning date _____

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